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# BOGOSLOF VOLCANOES.

BY

C. HART MERRIAM.

FROM THE SMITHSONIAN REPORT FOR 1901, PAGES 367-375  
(WITH PLATES I-III).



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## BOGOSLOF VOLCANOES.\*

By C. HART MERRIAM.

A little more than a century ago the icy waters of Bering Sea were violently disturbed, and, in a tumult of thunder, earthquake, and steam, a volcanic island was thrust up from the deep; and again, in the summer of 1883, the waters were once more convulsed, and, shrouded in steam and fog, a companion volcano was born.

The advent of the new volcano seems to have escaped observation, but the terrific disturbances attending the upheaval of Old Bogoslof were witnessed by native Aleuts and by a Russian named Kriukof, resident agent of the Russian-American Company at Unalaska, who at the time chanced to be on the nearest part of the adjacent island of Umnak.

Kriukof reported that on May 7, 1796, a storm from the northwest cut off the outlook seaward, but the following day, when the weather had cleared, a column of smoke was seen, followed by the appearance of a black object. During the night fire arose in this place, at times so bright that every object on the island could be clearly distinguished. An earthquake followed, accompanied by a terrific roaring, which seemed to come from the mountains to the south, and the rising island twice hurled stones as far as Umnak, a distance of 30 miles.

In 1806 Langsdorf passed near it at sea, and said of it: "The center point has on every side the appearance of a pillar and seems entirely perpendicular. On the northwest side are four rounded summits, which rise one above the other like steps."

The new island continued to grow, and in 1817 its circumference was estimated at  $2\frac{1}{2}$  miles, its height at 350 feet, and for 3 miles around the sea was covered with floating stones (pumice). By the Aleuts it was called Agashágok; by the Russians, Joanna Bogoslova, after St. John the Theologian.

In 1832 it was described by Tebenkof as about 1,500 feet in altitude, roughly pyramidal in form, the sides covered with sharp crags, which threatened to fall at any moment. At this date (1832) Tebenkof made

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\*Abstract by author of article in Harriman Alaska Expedition, Vol. II, pp. 291-336, October, 1901. New York: Doubleday, Page & Co. By permission of E. H. Harriman.

a rough sketch (fig. 1; originally published in Lutke's Atlas in 1836), which, so far as I have been able to ascertain, is the first published figure of the island; no others appear to have been drawn until 1873,



FIG. 1.—Tebenkof's sketch of Bogoslof and Ship Rock in 1832. From the south.

when Dall made six outline sketches from different positions. One of these, from essentially the same point of view as Tebenkof's, is here reproduced for comparison (fig. 2). It shows how the island had



FIG. 2.—Dall's sketch of Bogoslof and Ship Rock in 1873. From the south.

shortened, and how the elevated central peak had weathered and disintegrated until it was hardly higher than the northwest end, which end had suffered most from the inroads of the sea.



FIG. 3.—Old Bogoslof from west spit in 1891.

In 1887, according to Greenfield, the northwest peak was crowned by a slender pinnacle, which, in 1891, the date of my first visit, had fallen. In the latter year this peak was a huge, bluntly rounded pillar,



Old Bogoslof.



New Bogoslof.

BOGOSLOF AND CONNECTING SPIT IN 1884.  
Photographs by Lieutenant Doty.



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lower than the middle peak, and the depression between the two had become a long, deeply excavated saddle (fig. 3).

The illustrations already given show the island from the side, and give a false impression of its stability and form. When seen "end on," it appears as a narrow-crested ridge. It was described by Dall in 1873 as "a sharp, serrated ridge, about 850 feet in height, very narrow, the sides meeting above in a very acute angle, where they are broken into a number of inaccessible pinnacles" (fig. 4). This extreme narrowness has, of course, materially hastened the disintegration of the upper part of the volcano. Some idea of the loss between 1873 and 1890 may be had by comparing Dall's sketch (fig. 4) with a photograph taken by the *Albatross* in 1890 (fig. 5).



FIG. 4.—End view of Bogoslof from the southeast in 1873. After Dall.

When the Harriman expedition visited Bogoslof on the evening of July 8, 1899, fog rested so heavily on the summit that the form of the



FIG. 5.—Old and New Bogoslof from the southeast in 1890. From photo by U. S. Fish Commission.

two highest peaks could not be completely made out, but the "lowness of the ridge as a whole, the small size of the northwest peak, and the depth of the notch separating it from the rest of the mass, told too plainly of the rapidity with which the destruction is going on and foreshadowed the eventual downfall of the peaks.

#### NEW BOGOSLOF OR GREWINGK.\*

The towering cliffs of Old Bogoslof no longer battle alone with the angry storms of Bering Sea, for close at hand a new island has risen. Its birth was not witnessed by human eye; no earthquake shock marked its advent, and the date of its upheaval may never be known. It was first seen by Captain Anderson of the schooner *Matthew Turner*, on September 27, 1883, and was then in active eruption, throwing out large masses of heated rock and great volumes of smoke, steam, and ashes, which came from the apex and from numerous fissures on the sides and base, some of which were below the surface of the sea.

\*Captain Hague suggested for the new islet the name "New Bogoslof," and Dall, in an article published in *Science* in January, 1884, proposed that it be named "Grewingk," in honor of the Russian Grewingk, who, in 1850, published an important compilation of the various early accounts relating to Old Bogoslof.

Large rocks were shot high in the air, and falling back into the water sent forth steam and a hissing sound. After nightfall, the vessel being then about 25 miles to windward, fire was observed on the island. A month later (October 27) Captain Hague of the schooner *Dora* approached within a mile, passing through a streak of red water and then into a streak of green water. He is quoted as saying that black smoke, like that from burning tar, was issuing from the volcano; that it threw out flame, smoke, and red-hot rocks, and that among the sea lions observed near by were a number which had been scalded so that the hair had come off. He thinks many were killed.

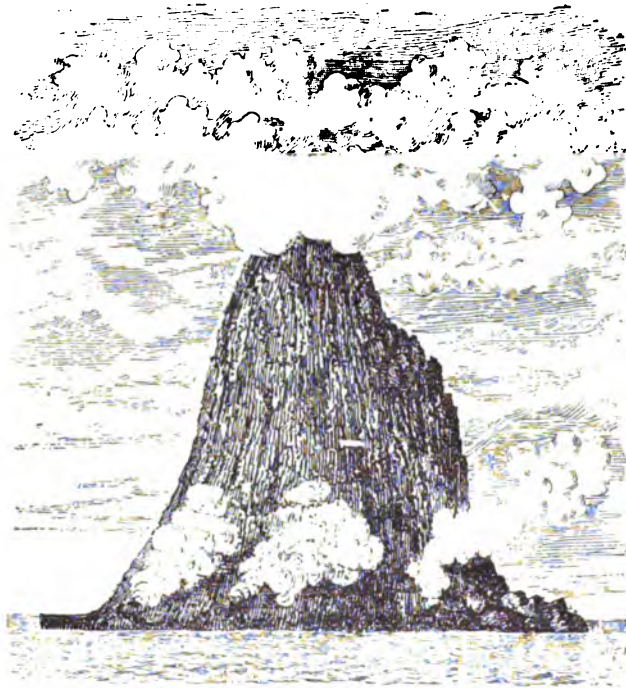


FIG. 6.—New Bogoslof in September and October 1883. Drawn by Prof. George Davidson from descriptions by Captains Anderson and Hague.

A short time afterwards both captains returned to San Francisco, where they communicated their observations to Prof. George Davidson, of the U. S. Coast Survey, who published a brief account in *Science*. They approached the island from opposite directions, passed close to it, and saw it from all sides. They agreed that the new island was larger than the old, from which it was distant about half a mile; that it rose precipitously from the sea with very steep sides; that great steam jets poured out around the base; that the summit was hidden by fog or clouds of steam, and that its height was somewhere between 800 and 1,200 feet. From their descriptions Professor Davidson made the accompanying drawing (fig. 6).

Smithsonian Report, 1901.—Merriam.

PLATE II.



**BOGOSLOF VOLCANOES, AUGUST 11, 1901.**  
Photograph by C. Hart Merriam.

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On October 20, 1883, between the visits of Captains Anderson and Hague, a shower of fine volcanic ashes or dust fell at Unalaska, concerning which the signal observer there reported: "At 2.30 p. m. the air became suddenly darkened like night, and soon after a shower of mixed sand and water fell for about ten minutes, covering the ground with a thin layer. The windows were so covered that it was impossible to see through them." Another eyewitness stated that a remarkable black cloud appeared in the north and soon overspread the entire heavens, settling down very low and cutting off the light of the sun. It finally broke and disappeared in a shower of ashes.

The first landing on the new volcano, so far as known, was made nine months after its discovery, by the officers of the revenue steamer *Corwin*, Capt. M. A. Healy, on May 21, 1884. The report on this visit, written mainly by Lieut. J. C. Cantwell, states that the height of the new volcano was about 500 feet; that its upper third was cleft by a great fissure or crater, the interior of which could not be reached or seen, owing to the heat, steam, and fumes of sulphur; that steam issued not only from the crater, but also and with great violence from

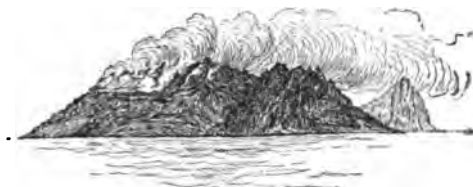


FIG. 7.—New Bogoslof from the northwest in 1884. From Lieutenant Cantwell's sketch "A." On the right the northwest cliff of Old Bogoslof may be seen.

rents or areas in the sides of the cone; that the numerous steam vents were lined with thick deposits of sulphur, and the escaping steam was suffocating; that the volcano was covered with a thin layer of ashes, the surface of which, from the action of rain, had been converted into a crust over which the party found great difficulty in climbing, breaking through and sinking ankle-deep to knee-deep into an almost impalpable dust which rose in clouds and nearly suffocated them.

At this time the old and new volcanoes were connected by a broad bar or spit (shown in Lieutenant Doty's photograph, Pl. I, and in Cantwell's chart, Pl. III, fig. 1), from which, near the base of the new volcano, rose a tower-like rock 87 feet in height. Barnacles and water-marks on this rock, 20 feet or more above sea level, indicated recent elevation.

A week after the visit of the *Corwin* (May 21, 1884) Lieut. George M. Stoney, of the Navy, arrived at Bogoslof and spent three days in taking soundings. Many earthquake shocks were felt on the schooner as it lay at anchor, and Lieutenant Stoney states that once, when climbing the volcano, "a most sensible vibration of the whole mass

took place; rumbling sounds and a dull roar, similar to the discharge of distant cannon, were heard at intervals; and though flames were seen only upon two occasions, yet this is believed to have been due to the little darkness of the season at that latitude."

In September of the following year (1885) the *Corwin* paid another visit to the island, and on leaving in the evening witnessed a most extraordinary spectacle. The summit of the volcano was enveloped in a bright sulphurous light, which burst from long rifts in its side and shone out against the black sky in the background, a striking and impressive display.

In 1890, when seen by the *Albatross*, the islands were still connected by the gravel bar or isthmus, and their collective length was estimated at a mile and a quarter (fig. 8).

The following year, 1891, it was my good fortune to visit the volcano. Returning from the Seal Islands, which we left on the evening of August 10, on board the *Albatross*, we made direct for the volcanoes. The night was densely foggy, as usual in Bering Sea in summer, and



FIG. 8.—The old and new volcanoes in 1890, from the southwest (being N. 4 E.). From photograph by U. S. Fish Commission.

the early morning brought no change. The ship was feeling her way cautiously, with no land in sight, when suddenly, about 7 o'clock, the fog lifted, and we saw directly ahead, and hardly a mile away, the bold front of the new volcano. It was with a thrill of excitement that we saw the precipitous cliffs of the northern end break through the fog, and heard the fierce rush of escaping steam, whose roar, when the engines stopped, drowned all other noises, not excepting the cries of the myriads of sea birds which swarmed about the rocks like bees about a hive. A little farther away, and somewhat to the left, Old Bogoslof soon came into view. The relations of the two are shown in the accompanying reproduction of a photograph (Pl. II) taken by me from the deck of the steamer. The bar or isthmus which from 1884 to 1890 connected the two islands had disappeared. From Old Bogoslof an entirely new and very long spit had formed on the west side, and extended westerly for about a mile, leaving an open channel a quarter of a mile wide between the two islands (chart, Pl. III, fig. 2).

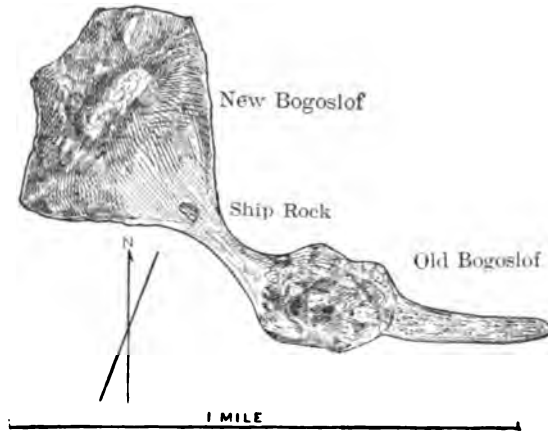


Fig. 1.—Cantwell's chart in 1884.

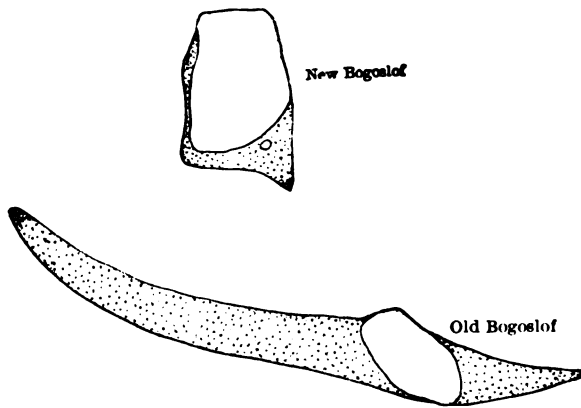


Fig. 2.—Merriam's chart in 1891.

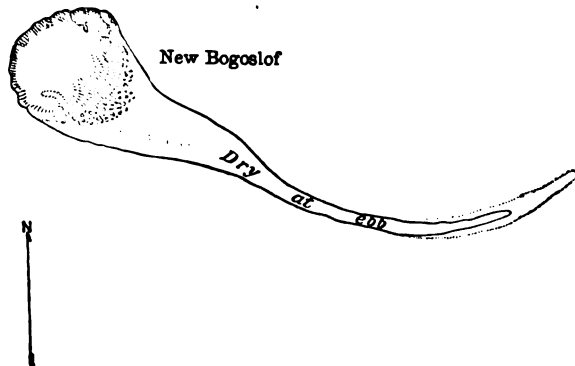


Fig. 3.—Dall's chart in 1895.

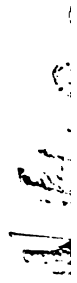
ROUGH CHARTS OF BOGOSLOF ISLANDS, SHOWING POSITIONS OF BARS IN 1884, 1891, AND 1895.



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The new volcano was enveloped in steam, which issued from thousands of small cracks and crannies and poured in vast clouds from a few great fissures and crater-like openings, the principal of which



FIG. 9.—In the steam, New Bogoslof, August 11, 1891.

was near the northeast corner, only a few feet above high-water mark. From this opening, the shape of which we could not make out, the steam rushed with a loud roaring noise. In most places it

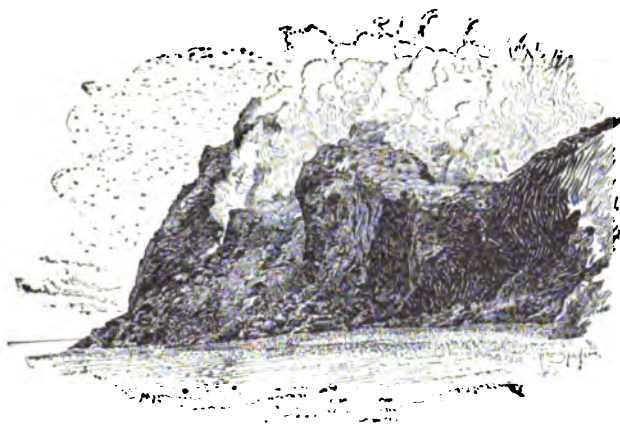


FIG. 10.—Northwest corner of New Bogoslof, August 11, 1891.

was impregnated with fumes of sulphur, and deposits of sulphur, some in very fine needles, were observed along the margins of the cracks. Most of the rocks were hot, and pools of hot water occurred along the beach.

Captain Tanner, who had been there the previous year, expressed surprise at the altered appearances. Not only had the connecting spit disappeared, but the island had decreased in height at least 100 feet, and the pinnacle had fallen and was lying in huge masses on the steep incline.

In 1895 Bogoslof was visited by Becker and Dall, of the U. S. Geological Survey. They found the activity of the steam vents greatly diminished and the top of the volcano lowered and flattened. This flattened plateau-like form has continued, and is excellently shown in

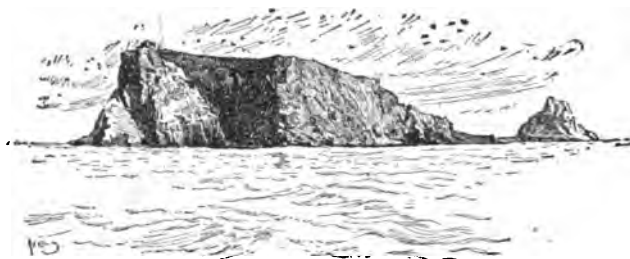


FIG. 11.—The islands from a little east of north in 1897. From photograph by Dr. L. Stjeneger.

the accompanying illustration from a photograph taken by Dr. Leonhárd Stjeneger in 1897 (fig. 11).

In 1899, when seen by the Harriman expedition, no change was observed.

#### SUMMARY.

Accounts of early navigators and traditions of native Aleuts agree that long before the upheaval of the modern volcanoes a large pillar-like rock stood in the place now occupied by Bogoslof Islands. The dwindling remnant of this large rock, known as Ship Rock, whose position was between the present islands, fell in 1888 or 1889. In early times it must have been partly surrounded by low rocks or spits, for it was always a great resort of sea lions, and these animals do not remain about perpendicular rocks in the open ocean, where there is no place to land.

In 1796 a volcanic island (Old Bogoslof) was upheaved about half a mile southeast of Ship Rock. For some years it increased in size and then slowly cooled, after which it began to weather and disintegrate, and to be torn away by the sea.

In 1883 a new volcano appeared close to Ship Rock, but on the opposite (northwest) side. Its summit for the first few years was mountainous and irregular, but between 1891 and 1895 it became flattened and plateau-like.

For six years (1884-1890) Old and New Bogoslof were completely connected by a broad spit, or isthmus.

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In 1891 the isthmus was washed away and a new spit a mile long formed on the west side of Old Bogoslof (fig. 12). The date of its disappearance is unknown, but in 1895 no trace of it was left.



FIG. 12.—Old Bogoslof (on left) and part of New Bogoslof (on right) August 11, 1891. Shows east and west spits of Old Bogoslof.

In 1895 a spit of about the same length reached out in an easterly direction from New Bogoslof, and in 1899 evidence of its presence was recorded.

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